CCAMP Conventional Water Quality Monitoring Standard Operating Procedure

Introduction

The CCAMP Conventional Water Quality (CWQ) Standard Operating Procedures (SOPs) document describes techniques used by CCAMP staff in the collection of surface water quality data. This document also describes site selection criteria, all field measurement procedures, collection of water samples for laboratory analysis, sample handling, quality assurance and data management

Sampling Preparations

1) Lab Coordination (1 week in advance of sampling)
   a) BC labs (661) 327-4911
      i) Arrange for bottles to be delivered (2, 1L/site, 1 coliform/site)
      ii) Arrange for sample pickup
   b) Creek (805) 545-9838
      i) Notify of sample drop off (dates and number of samples per day)
2) Sign Out a Vehicle (1 week in advance of sampling)
3) Sign out a digital camera (1 week in advance of sampling)
4) Sign out a cell phone, from Karen (1 week in advance of sampling)
5) Prepare & print (ex. S: CCAMP/Santa Barbara/Monitoring…)
   a) Labels for bottles (edit/replace-change dates, etc.) (s:CCAMP/CCAMPers/in personal folders)
   b) Data sheets (s:CCAMP/CCAMPers/in personal folders)
   c) Chain of Custody forms (COCs) (s:CCAMP /CCAMP monitoring/BC chain or Creek chain)
6) Calibrate the Hydrolab DS4a (See appendix A for Calibration procedures)

Field Equipment and Supplies

Field data sheet (see Appendix)
Clipboard
2 Chain of custody sheets (see Appendix)
Pencil and pen
Thermometer
20 Coliform bottles
1 chlorophyll bottles
41 cwq bottles
Bottle labels and permanent marker
Disposable Gloves
Digital camera / Disks
Cell Phone
Hydrolab Datasonde and surveyor 4a
1 gallon of water
Squirt bottle
First aid kit and a change of clothes
Cooler with ice
5 gallon bucket
100m rope
Bottle dipping device
Hand wipes
Leather work gloves

Safety equipment and considerations

Tall rubber boots, felt soled if necessary
Elbow length rubber gloves
Cones
Orange vests

Personal safety equipment:
For your own protection from pathogens and other organic pollutants each field personnel will have long sleeve rubber gloves and watertight tall rubber boots available for collecting samples. See your supervisor to have personal safety equipment issued to you.

Considerations for sampling from bridges:
Park the vehicle in the shoulder of the lane, at the beginning of the bridge
Turn on hazard lights
Wear orange vest with reflective tape
Place cones along the shoulder preceding the location where personnel is collecting the sample
Move the vehicle a safe distance from the road's edge before processing samples in the back.

Sampling Procedures

Surveyor 4a File Storage Procedures

Create a file in the hand held surveyor for storage of all data collected in the field. Procedures for file set up can be found in Appendix A, Surveyor file set up procedures. A new file should be used every day and named by the date of sampling, i.e. {01/22/02}.

Pre-Sampling QAQC Sample (Field equipment verification sample)

A QAQC sample of tap water is measured prior to sampling. The data is stored in the hand held Surveyor 4a and the sample is kept in a clean sample bottle labeled "QAQC" with the day's date. The sample is measured again after all sampling is concluded. These measurements are recorded in the pre-blank and post-blank rows on the field data sheet. They are used to ensure that pH, conductivity and turbidity have not significantly drifted during the sampling day. This sample is subsequently sent to BC lab to verify accuracy of Hydrolab measurements. It's recorded on the COC form as QAQC.

Instream Sampling Location

For all wadeable streams and rivers, samples are collected from the center of the stream flow or the thalweg. Stream profiles have been established at several sites. In this case samples should be collected at this location and accompanied by a stage and flow measurement. Sampling from the shore is the least acceptable location. In streams or rivers that are not wadeable samples are collected from an overpass or bridge. Specific procedures for field techniques are discussed in the following text.

Site Photographs

Take a photograph each time a site is visited. Site photographs are taken from the location the sample is collected looking up stream. Take any additional photographs you find interesting, such as aquatic fauna, unusual structures or flow patterns. Record picture numbers for all photographs taken at a site on the data sheet.

Field Measurements and Sample Collection

1) Air Temperature: Place thermometer in an area not directly in the sun, but where the air temperature for that area will be obtained (above ground, in the shade, avoid influence from vehicle).

2) In Stream Procedures
   a) Affix labels to bottles (two qt bottles and 1 coliform bottle). Labels contain the following information: Site name, date, time, project ID, and samplers name.

b) Take the Hydrolab and labeled bottles along with the data sheet to the site. Select an area in the water that has flow and is deep enough to submerge the Hydrolab probes, preferably in the thalweg. Record Hydrolab results on data sheet and store the measurements in the hand held Surveyor 4a.

c) Collecting a Grab Sample
   i) Wear clean disposable gloves
   ii) Collect a depth-integrated sample from the thalweg facing up stream. Submerge the bottles slowly, obtaining a sample representing the entire water column.
   iii) Collect the coliform sample last, open and close the bottle underwater to avoid sampling surface scum. Be sure to leave an air space and avoid touching the bottle rim or the inside of the lid.

3) Bridge and Pole samples
if river, tributary or creek is not wadeable samples are collected either from a bridge using a 5-gallon bucket, the bottle dipper and the 100m rope or from the shore using a pole and bottle dipping attachment. Use your best professional judgment to evaluate the conditions and choose the safest sampling method.
   a) Bridge Sample collection
      i) Hydrolab Sample Collection: Lower and rinse the bucket three times. Fill the bucket, and submerge Hydrolab probes into bucket to obtain measurements.
      ii) Grab Sample Collection: Place properly labeled bottles into the bottle dipper, remove lids (coliform last) using a glove. Hold the lids face down while the second field person lowers the bottles into Waterbody to fill. Replace lids immediately following collection of samples, coliform lid first.
   b) Pole sampling
      i) Hydrolab Sample Collection: Lower and rinse the bucket three times. Fill the bucket, and submerge Hydrolab probes into bucket to obtain measurements.
      ii) Grab Sample Collection: Place properly labeled bottles into the bottle dipper, remove lids using a glove. Hold the lids face down while the second field person lowers the bottles into the waterbody facing upstream to fill. Replace lids immediately following collection of samples, coliform lid first.

4) Field Observations
   a) Record information relating to the shading of the stream, algal cover in stream as well as riparian vegetation and aquatic vegetation.
      i) Shading: Record the percent of the stream's surface (water surface), up stream from your sample location, that you estimate would be shaded if the sun was directly over the creek.
      ii) Algae:
         (1) Filamentous (Fill): Record the percent of the flowing water surface, up stream from your sample location, that you estimate is occupied by filamentous algae.
         (2) Other Periphyton (Peri): Record the percent of substrate in the active channel, up stream from your sample location, that you estimate is covered in periphyton. Other periphyton is defined here as the living community attached to the substrate, including algae that is not the green filamentous type, aquatic mosses, fungi, diatoms and sessile invertebrates. To make this estimate feel the surface of the rocks and other substrate materials and estimate the percent of the substrate that is covered with a slimy organic community.

iii) Plants:
(1) Bank: Record the percent of the surface of both banks, up stream from your sample location that you estimate to be covered by vegetation. This estimate refers only to plants and roots at the waters edge.
(2) In Stream: Record the percent of the flowing waters surface, up stream from your sample location that you estimate to be occupied by aquatic vegetation. This is a percent of the total waters surface that is occupied by aquatic vegetation.

iv) Dominant Substrate:
Record the dominant substrate in the upstream reach of the sample location using one of the following categories: Boulder (B), cobble (C), gravel (G), sand (S), fines (F).

b) Visually assess the stream corridor and comment on anything that you fell may directly affect or contribute to changes in water quality. Some standard comments and categories of observations follow.

i) Biological Activity: Count the number of fish, birds or invertebrates observed and record one of the following categories: True count up to 25, 25-50, 51-75, 76-100, >100. For fish estimate the size of the fish that are present.
ii) Color: Record any unusual watercolor, suspended matter, foam or other debris.
iii) Odors: Record any odors such as H_2S, animal waste or any identifiable odor, else record unidentified odor.
iv) Instream activities: Record any construction, major erosion events or other instream activities that may impact water quality
v) Weather: Record any recent weather events such as heavy rains, cold front or heat spells, and comments that reflect changes in flow such as recent scour.
vi) Trash and Debris: Record the extent of trash and discarded debris on the banks and in the stream. Certain types of trash should be specifically listed such as human wastes, homeless encampments, aerosol cans, batteries or any other debris that directly affect water quality. Other categories of trash that should be noted include dumping of furniture or appliances, and the presence of paper and recyclable trash. Record the true number of paper and recyclable trash items up to 10 items (count 1-10 items of trash), greater than 10 items should be recorded as >10 items of trash.
vii) Tidal Influences: Record evidence of recent tidal surge (i.e. kelp or driftwood) or record possible salt-water influence.

5) Upon returning to the vehicle:
a) Record the air temperature for that site
b) Place the bottles in cold ice chests (4°C)
c) Rinse the Hydrolab cup and probes and keep some clean water in the cup between sites, keeping the probes moist.

Sample Handling

All samples are to be stored in ice chests at 4°C until transferred to the contract laboratory. Ensure that the number of samples in the ice chest does not compromise the sample temperature. The maximum number of bottles per ice chest is determined by ensuring that each bottle is in contact with at least one blue ice cube.

Holding Time is defined as the amount of time between collection of the sample and the initiation of its analysis. The holding time for coliform samples is 6 hours and for all other CWQ parameters the holding time is 24 hours. All samples must reach the lab within this time allotment.

Post sampling QAQC sample

1. Turbidity, pH and conductivity drift and accuracy verification
   The procedure is as follows: after the last site is sampled, rinse the Hydrolab cup and fill cup with the blank. Record data in the section labeled "Post Measurements" and store measurements in the surveyor 4a. Pour sample back into the blank bottle, labeled with a unique name (QAQC), date and time and place in the ice chest. This sample is to be analyzed by the contract laboratory for *pH, conductivity* and *turbidity* only. Dissolved oxygen is not verified using this procedure.
2. Lab verification of Dissolved Oxygen
   DO accuracy is measured at Creek Labs. Upon arrival at Creek Labs you can quality check the Hydrolab's DO measurement using a different blank in the Hydrolab and comparing the DO readings to those obtained using the lab's equipment. Use the Hydrolab cup to take measurements with the Hydrolab and record these measurements on the data sheet under post Blank. Use the same Hydrolab cup to have the lab measure DO. This ensures that the sample has not been stirred or agitated between measurements. Record their measurement under post Lab.

Quality Assurance

a) Duplicate Samples: In order to assure quality and consistency of lab results, duplicate samples are collected at 10% of the sites. These samples are collected at the same site every time and each replicate sample has a unique site name to disguise duplicate samples from the lab. The duplicate sample is collected to measure the variability in the environment as well as variation that is introduced by collection, handling and processing of samples. Duplicate samples are collected by submerging two bottles side by side, collecting 2 depth integrated samples simultaneously.

b) Pre / Post Sampling field equipment verification sample:
   i) Turbidity, pH and conductivity drift and accuracy verification
      Samples of tap water are measured by the field equipment pre and post sampling and subsequently are sent to the lab to verify that the Hydrolab's readings are accurate. This pre and post QAQC measurement is used to detect any drift in probe measurements (for ph, turbidity and conductivity) over the course of the sampling event.
   ii) Lab verification of Dissolved Oxygen
      Dissolved Oxygen is measured by the Hydrolab and subsequently by Creek labs following each sampling day. This sample is used to evaluate the accuracy of the Hydrolab measurements of DO taken on a given field day.

c) Chlorophyll calibration QA sample: A chlorophyll QAQC sample is collected from a site at which chlorophyll is measurable. At this site, a single chlorophyll sample is collected in a 100 ml amber bottle and processed by Creek Labs.

d) Chain of custody: A chain of custody form documents the change in possession of the samples between the time it is collected and analyzed (see attached). Retain copies of all chains with the field data sheet. The following information is to be included on the chain of custody:

Project name	Sample ID names
Sample date and time	Name of collector
Type of sample	EPA or SM method and Reporting format
Billing information	Receiving signature
Relinquishing signature	

Analysis used to assess conventional water quality

Analyte	Units	MDLs	Sampling Approach
PH	pH units	n/a	DataSonde 4a
Conductivity	US/cm	1.0	DataSonde 4a
Turbidity	NTU	0.1	DataSonde 4a
Dissolved Oxygen	Ppm	0.01	DataSonde 4a
Oxygen Saturation	% Saturation	n/a	DataSonde 4a
Water Temperature	Celsius	n/a	DataSonde 4a
Air Temperature	Celsius	n/a	Thermometer (°C)
Total Coliform Bacteria	MPN/100 ml	2	25-tube dilution
Fecal Coliform Bacteria	MPN/100 ml	2	25-tube dilution
Nitrate-N	mg/l	0.02	EPA 300.0
Nitrite-N	mg/l	0.01	
Total Kjeldahl Nitrogen	mg/l	0.1	EPA 351.2
Ammonia-NH_3	mg/l	0.02	EPA 350.1
Ortho Phosphate	mg/l	0.01	EPA 365.1
Total Phosphate	mg/l	0.06	EPA 365.4
Chlorophyll a	ug/l	0.1	DataSonde 4a
Total Suspended Solids	mg/l	0.5	EPA 160.2
Fixed Suspended Solids	mg/l	0.5	EPA 160.2
Total Dissolved Solids	mg/l	4.0	EPA 160.1
Fixed Dissolved Solids	mg/l	4.0	EPA 160.4
Volatile Dissolved Solids	mg/l	5.0	EPA 160.4
Volatile Suspended Solids	mg/l	0.5	EPA 160.4
SO_4	mg/l	5	SM-2340B
Chloride	mg/l	0.06	EPA 300.0
Boron, Dissolved	mg/l	0.05	EPA 6010
Calcium	mg/l	0.01	EPA 6010
Magnesium	mg/l	0.02	EPA 6010
Sodium	mg/l	0.06	EPA 6010
Corridor Shading	%	n/a	Visual estimate
Algal Cover	%	n/a	Visual estimate
Instream Plant Cover	%	n/a	Visual estimate

Post Sampling Procedures

1) Equipment Checklist
   a) Prepare equipment for next use
      i) Hydrolab
         (1) Ensure there is at least 1inch of water in the Hydrolab cup to keep the probes moist
         (2) Rinse and inspect the Hydrolab probes.
         (3) Rinse the glass surfaces of the chlorophyll probe with deionized water and wipe with lens paper or a q-tip
      ii) Ice chests
         (1) Empty all ice chests and return blue ice to freezer. Stack ice chests with lids open so that residual water will evaporate
      iii) Camera
         (1) Return camera to the regional board cabinet, place battery on charger
      iv) Vehicle
         (1) Make sure vehicle has a full tank of gas, windshield clean and any obvious dirt inside the vehicle has been vacuumed out!

2) Electronic Chain of Custody

   This file documents the field data collected and the analysis requested from the lab. The purpose is to identify all data that we should expect to receive, including lab, meter, subjective estimates and notes.
   a) Open file in s:/ Master Data Files & backups/ COCentry.
   b) Use the COC to enter each site tag, date, time and all analysis requested from the lab, blue columns in the COCentry file refer to lab data.
      i) The lab tag column contains all site tags listed on the COC, including the unique tags given to duplicate sites. The Site Tag column should reflect the actual site tag used by the project.
   c) Use the Field data sheet to enter all analyses to be downloaded from the Hydrolab, including pre, post and lab analyzed blanks. Green columns refer to data collected in the field Blue to data to be received from the lab.
   d) Make sure that the **duplicates and blanks** are **designated in the purpose column** using the following: FD, BLANK-PRE, BLANK_POST, AND BLANK-LAB. Every single sampling day should have these 4 rows associated with sites entered into the electronic COC.

3) Slurp in the COC
   a) Open Admin Code (s:/Master Data Files& backups/AdminCode)
   b) Hit the [perform COC] button on the control page
   c) If no error message comes up on the report worksheet continue to step 4) if an error message appears fix all errors and hit the [perform COC] button again
   d) Check the Big 8 columns (2-9) in Mastermon and hand enter any information that was not slurped in.

4) Surveyor 4a download
   a) Download surveyor 4a file following the procedures in Appendix A.
   b) Name file the Date you were in the field (i.e. 01/16/02)
   c) Download file into the folder created for data (s: /data processing/ slurp/Hydrolab).
      This is the file where all original incoming data is stored.
   d) Make a copy of this file and paste it in to s: /master data files/Hydrolab
      This is the file where we store all Hydrolab data to be slurped into MasterMon.

5) Slurp in the Hydrolab data
   a) Open admin code (s:/Master Data Files& backups / AdminCode)
   b) Hit the [scan hydrolab files] button on the control page. If no error message comes up on the report worksheet continue to step c). If an error message appears fix all errors and hit the [scan hydrolab files] button again. **YOU MUST SCAN BEFORE YOU READ FILES !!!!!!!!**
   c) Following scan hit the [read hydrolab files] button
   d) Check the Big 8 columns (2-9) in Mastermon and hand enter any information that was not slurped in.

6) Enter Field Data and QA Hydrolab slurp
   a) Use field data sheets to ensure that all field data is present in the database and to hand enter the following parameters into MasterMon
   b) Find the row of data with the hydrolab measurements (Indicated in the ID column, by the letter H and the date time (for example Jan 16th 2001 at noon looks like H011602120000)
   c) If Hydrolab data for a given site is not present hand enter data for that date and time.
   d) Compare data in Mastermon to field data sheet (time, DO, pH etc.)
   e) Hand enter the following parameters on the same row: Air temp, Cshade, Algae_fill, Algae_peri, Cover_Bank, Cover_In, Flow_Q and notes.

7) Site Photographs
   All photographs taken in the field must be labeled in a dated folder.
8) Download all site photographs into a dated folder in the project's file found in s/CCAMP/CCAMP monitoring/ Site Pics/ Dated folder.
   a) Name each picture with the site tag and date (month. year), for example Jalama in January of 2002 picture is named 315JAL.01.02

Appendix A

Hydrolab DS4a procedures

Calibration Procedures (Hydrolab DS4a)

Prior to each sampling event, the Hydrolab DS4a must be calibrated using the following procedure.

Calibration Supplies:

Calibration log binder	1L Mason jar
Deionized water	PH standards 7.0 and 10.0
DS4a	Conductivity standard ~1500us
Surveyor 4a	Turbidity standard 100 NTU
Calibration cord	Chlorophyll calibration donut

1) **Pre Calibration QAQC Sample**
   Fill a 1L Mason jar filled with tap water and submerge the Hydrolab probes, this is the pre calibration **blank.** Record the "pre cal blank" parameters on the Calibration log, and set jar aside until calibration is completed.
2) **Two-point Calibrations**
   For each parameter except oxygen conduct a two-point calibration; this is to bracket the highest and the lowest values you expect to encounter in the field.
   a) **PH**
      - Rinse the Hydrolab cup with the pH solution 7.0
      - Fill the cup with the 7.0 solution and submerge the probes
      - Let stabilize and record "pre cal" values in the calibration log
      - Calibrate to 7.0 using the Surveyor 4a:
        select "Calibration"
        select "sonde"
        select "pH"
        select "7.0"
        press "done"
        press any key
        select "go back"
        record the "post cal" value on the calibration log.
      - Discard the pH 7.0 solution, rinse the Hydrolab cup with the pH solution 10.0, rinse the Hydrolab probes with deionized water
      - Fill the cup with the 10.0 solution and submerge the probes
      - Let stabilize and record the pre cal values in the calibration log
      - Calibrate to "10.0" following above procedures for surveyor 4a.

   b) **Conductivity**
      - Rinse the cup and probes with deionized water; fill the cup with deionized water, submerge the probes and record the "pre cal" value following the procedures above; calibrate to 0.0 us and record the "post cal" value.

- Rinse the cup with the calibration standard, fill the cup with the calibration standard (1413us), submerge the probes, let stabilize and record the "pre cal" value; calibrate to 1413us following the above procedures and record the "post cal" value.

c) **Turbidity**
- Rinse the cup and probes with deionized water; fill the cup with deionized water and submerge the probes; record the "pre cal" value; following above procedures calibrate to 0.0 NTU and record the "post cal" value.
- Rinse the cup with the calibration standard (100 NTU); submerge the probes and record the "pre cal" value; calibrate to 100 NTU following the above procedures and record the "post cal" value.

d) **Dissolved Oxygen mg/L**
- Calibrate D.O. "mg/L"; Record the "pre cal" measurement on the calibration log. Using standard methods print out on front of "Meter Calibration Log" binder, find temperature measured by Hydrolab on the print out and calculate appropriate DO value at "0" chlorinity. For example, if temperature is 20 degrees, calibrate to 9.092 mg/L; select 9.920 and record "post cal" measurement.

e) Dissolved Oxygen, %Saturation *Note: automatically done when part "d" is finished.
- Set up for oxygen: fill cup with tap water so that probes are <u>just above</u> the water line; wipe off probe tops using lens tissue to remove all water droplets; leave Hydrolab running with the cup sealed for at least 20 mins.
- While the Dissolved Oxygen is stabilizing calibrate the chlorophyll probe without splashing the DO probe.
- After at least 20 mins calibrate % saturation. Record "pre cal" in "D.O. sat" section; select "done" when barometer reading says "760;" record "post cal."

f) Chlorophyll
- Submerge chlorophyll probe in DI by holding a full cup up to the probe and record "pre cal;" calibrate to "0" following the above procedures for the surveyor 4a and record "post cal."
- Place the calibration donut on the chlorophyll probe and record "pre cal"; calibrate to "50" following the above procedures for the surveyor 4a and record "post cal."

3) Post Calibration QAQC sample
- Re-measure water used as the pre cal blank (1L Mason jar filled with tap water). Record the "post cal blank" parameters on the Calibration log.

Surveyor 4a File Set Up Procedures

1. Create a File on the Surveyor 4a for each sampling event
    - Select "Files", "svr 4a", "create", "manual", Give the file a name
      File names are the date you were in the field (i.e. 01.18.02)
2. Storing data in the Surveyor 4a
    - Select "Files" and select the file name (i.e. 01.18.02)

Surveyor 4a Downloading Procedures

1) Connect the surveyor to the PC (use the COM 1 connection), **and then** turn both machines on.
2) On your PC, go to **Start > Programs > Accessories > Communications >Hyperterminal**.
3) Select the icon titled Hypertrm or Hypertrm.exe.
4) Select a name and an icon, the same name as the file in the surveyor is a good bet.
5) A window will open titled 'Phone Number'. In the field titled 'Connect Using:' Use the pull-down menu to select 'Direct to Com 1' and Click OK.
6) Another window will open titled 'Com 1 Properties'. In this window, you will select
    a) the baud rate at 19200
    b) data bits should be 8
    c) parity should be none
    d) stop bits should be 1
    e) The flow control should be set to 'Xon/Xoff'
7) The screen should clear. At this time select **File > Properties**. A window will open with two tabs at the top of it. One tab will say 'Phone Number', the other will say 'Settings'. Click on the tab entitled 'Settings'. Your terminal emulation should be ANSI. Also make sure that the button next to terminal keys is highlighted. Click OK.
8) In the top, left-hand corner of your screen there should be two phone icons. Click on the one with the receiver off the hook. This will disconnect the session. Next, click on the icon with the receiver on the hook. This will re-connect you. This is done to allow the program to remember the changes that you have just made.
9) On the PC, go to Transfer/Receive and set "use receiving protocol" to X-modem and set the location you would like the file to be saved in as S:\Data processing\Slurp Originals\Hydrolab slurp. Click on 'Receive' and enter the file name (Use the same file name that you created in the Hydrolab.).
10) You are now ready to transmit from your sonde. On the Sonde, select files > transmit.
    a) Select the appropriate file on the surveyor.
    b) At the prompt, select file type "SS importable" and data should flow.

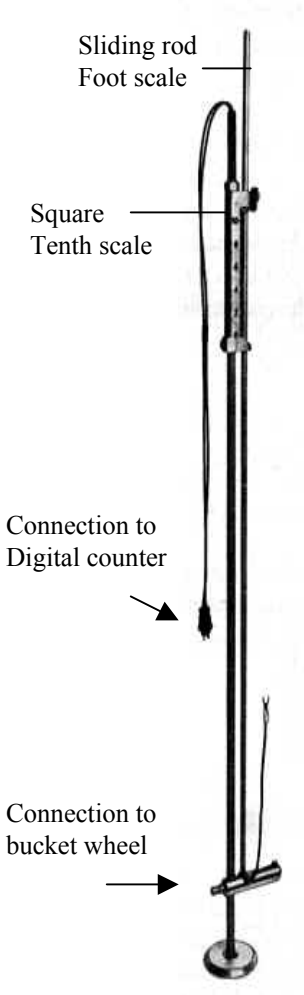
Flow Measurement Procedures

Preparation for collection Flow Measurements

- Remove the brass travel pin from the bucket wheel and replace it with the silver pin.
- Attach bucket wheel to the Top Setting Rod
- Attach the digital counter to the connector at the top of the rod

Collection of Flow Data

- Visually inspect the stream channel to identify the location of the cross section. The ideal cross section will have a flat uniform substrate, the least desirable substrate is uneven with large obstructions and immeasurable sections of flow.
- Measure the stream width, wetted channel and record on the data sheet. Stretch a measurement tape (in 10^{th} of feet) across the flowing stream bed and record stream width
- Determine the number of flow measurements to be taken. Five measurements are a minimum for all streams. If it is possible, collect 7-10 measurements at each site. Use your best professional judgment to determine the spacing and location of flow measurement sections. Evaluate the shape of the streambed, dimensions of the substrate and volume of water to determine measurement locations, which will provide data representing the many different flow regimes present. Flow measurements sections do not have to be of equal width, however no section should have greater than 50% of the flow when 5 measurements are taken and no more than 10% of the flow when 10 measurements are taken.
- Use the top setting rod to set the bucket wheel at 60% depth of the water column.
    - The sliding rod measurements refer to whole foot depths The rod has single marks representing .10 of a foot, double marks representing .5 foot and triple marks representing 1.0 foot.
    - The square, which the rod slides through, is marked in tenths of feet. If the creek is 1.2 meters deep position the 1 foot (triple mark) on the rod next to the .2 mark on the square. The bucket wheel is now set to 60% of the total depth of the water.
- Set the digital counter to 40 seconds and hit start.
- Ensure the wading rod is kept vertical and the bucket wheel kept perpendicular to the flow.
- Record the number of rotations of the wheel counted on the digital display.



Appendix B

CCAMP Monitoring Forms

1. BC Laboratories, Chain of Custody Form
2. Creek Environmental Laboratories Chain of Custody Form
3. Field Data Sheet
4. Calibration Log
5. Maintenance log

BC LABORATORIES, INC.	4100 Atlas Court • Bakersfield, CA 93308 (661) 327-4911 • FAX (661) 327-1918	CHAIN OF CUSTODY

Report to/Contact person:

Mary S Adams

Central Coast RWQCB
81 Higuera St. Suite 200
San Luis Obispo, CA 93401
(805) 542-4768
Fax 788-3502

Project: **CCAMP**

Sampler:

Analysis Requested

Lab #	SiteTag	Date and Time sampled	MATRIX = Water (w), Sediment (s)	NUTRIENT SERIES																			
				EPA 300.0 NO3 as N	**EPA 353.2** NO2 as N	**EPA 350.1** NH3 as N	**EPA 351.2** TKN	**EPA365.4** Total PO4 as P	**EPA 365.1** Ortho PO4 as P	**EPA 160.2** TSS	**EPA 160.4** Fixed & dissolved SS	**EPA160.1** TDS	**EPA 6010** Calcium	**EPA 6010** Sodium	**EPA 6010** Dissolved Boron	**EPA 6010** Magnesium	**EPA 300.0** Chloride	**SM 2340B** Hardness (CaCO3)	**EPA 300.0** Sulfate	**25 tube dilution** Total and Fecal Coliform		PH, SPC (us), and Turbidity

Comments:

Billing Info

Name: Regional Water
Address: 81 Higuera St. Suite 200
San Luis Obispo, CA 93401-5427

Attention: **Cyndee Jones**

Relinquished By:

Date and Time:

Received By:

Date and Time:

2. Creek Labs Chain of Custody Form

Please Print in Pen

Client Name	Contact	Phone	Due Date:
Regional Water Quality Control Board	Mary S. Adams	542-4768	24Hr 48Hr Other Normal TAT

Address	City	State	Zip	Fax	Cell	Beeper
81 Higuera, Suite 200	San Luis Obispo	CA	93402	543-0397		

Project Name/Number	PO#	Copies To:
CCAMP		

Bill to: (if different from above) BC Laboratories

Sampler Name (Print)	Comments:	Matrix Key: DW = Drinking Water AQ = Aqueous SL = Soil/Solid

Sample Description	Date/Time Sampled	Analysis		Matrix	# of Bottles	Preservative / Type Bottles	Lab Sample #
		25 tube Total and Fecal coliform	**SM 10200H** Chlorophyll a	**Aq**			

RELINQUISHED BY (Sign)	(Print)	(Organization)	DATE/TIME	RECEIVED BY (Sign)	(Print)	(Organization)
		RWQCB				**Creek Environmental Laboratories, Inc.**

FOR LAB USE ONLY: Shipping Method: Client/ Lab/ Courier**:** Sample Conditions: Intact: Y/ N Cold: Y/ N Custody Sealed: Y/ N

REMARKS

3. Field Data Sheet for Conventional Water Quality Monitoring

Site	Time	pH	Cond(uS)	Turbidity	DO(ppm)	DO%sat	H_2OTemp	Salinity	Chlorophyll	Air Temp	shading	algae	plants	flow	**Substrate**
Cal date												Fill / Peri	Bank / in		**Dates of calibration**
Blank															**Pre Measurements**
Blank															**Post Measurements**
DS4a/ Lab															**Post Meas, Lab**
313SAB															
314SYP															
314SYC															
314SYI															
314SYL															
314SAL															
314MIG															
314SYF															
314SYN															
314SAC															
314SAR															
314SAI															
314SAE															

3. Page 2 Field Data Sheet for Conventional Water Quality Monitoring

Site	Picture #	Picture Notes	Stage	Depth/Flow	Depth/Flow	Depth/Flow	Depth/Flow	Depth/Flow	General Notes
308BSU									
305BSR									
308SUR									
308GAR									
308LSU									
308SJC									
307CML									
307CMD									
307CMU									
307TUL									
307CMN									

4. Calibration Log For DS4a

Analyte	pH	pH	Cond	Cond	Turb	Turb	DO %	Chlorophyll	Chlorophyll	
Units			us/cm	us/cm	NTU	NTU		mg/l	mg/l	
Date										
Pre Cal Blank										
Post Cal Blank										
Pre Cal										
Post Cal										
Method										
Your Initials										
Date										
Pre Cal Blank										
Post Cal Blank										
Pre Cal										
Post Cal										
Method										
Your Initials										
Date										
Pre Cal Blank										
Post Cal Blank										
Pre Cal										
Post Cal										
Method										
Your Initials										
Date										
Pre Cal Blank										
Post Cal Blank										
Pre Cal										
Post Cal										
Method										
Your Initials										

5. Maintance Log for DS4a

Maintenance Log

Hydrolab unit ID#	Date Repaired	Part Repaired	Repaired By	Notes